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Citation

YEOH, Caroline; KEVIN, Wongso; and TAN, Wee. The Singapore-India Connection: A Tale of Two Industrial Parks. (2004). *4th Asia Academy of Management Conference: Moving Forward, Leading Asia in a New Era, Shanghai, China, 16-18 December 2004*. Research Collection Lee Kong Chian School Of Business.
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Submitted to
The 4th Asia Academy of Management Conference

Moving Forward: Leading Asia in a New Era
Shanghai, China
16-18 December 2004

THE INDIA-SINGAPORE CONNECTION: A TALE OF TWO INDUSTRIAL PARKS[1]

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1 This research is funded by the Wharton-SMU Research Centre, Singapore Management University.

ABSTRACT

In recent times, Singapore has, as part of its regionalisation strategy, established industrial parks in various countries, including China, Vietnam, and India. The parks are marketed as a winning combination of the host country's unique location advantages and Singapore-style efficiency and management know-how. Singapore's foray into India, in particular, was marked by the setting up of the ITPL in Bangalore; a development that met with great success. However, with global businesses shifting interests towards India, and competing industrial parks emerging to meet the increasing demand, ITPL is faced with stiff competition from other industrial parks; and Singapore has since announced its partnership in phase 3 of another industrial park, the locally set-up HITEC City. This paper compares the pull factors and constraints of ITPL with phase 1 and 2 of the HITEC City and also differentiates between these two sites, which both gain leverage from India's cheap plentiful labour, through the use of in-depth case studies. It also discusses the likely effects on HITEC of its new Singapore connection. Through this comparison, the factors that influence tenants in these industrial parks – and the influence of the Singapore connection on these factors – will be made clear.

Key words: Industrial Parks - Singapore – India

INTRODUCTION

Though only a city-state with limited natural resources, Singapore has nonetheless managed to achieve significant economic growth in a comparatively short amount of time by focusing on its core proficiencies. Singapore's strengths are found in excellent infrastructure, technological

abilities, constant economic reform, as well as a positive reputation among foreign firms; or what Singapore terms its 'human capital'. These strengths have played a significant part in attracting foreign direct investment into the country ever since the mid 1960s, when the move to woo foreign investors in order to fuel the country's economic development began (Chia, 1986; Pang, 1995; Rodan, 1989; Murray and Pereira, 1995; Blomqvist 2001). This inflow of foreign investment was the main factor behind the nation's initial growth; however, a slight change in tactics was observed by the mid 1980s. Instead of drawing investors into the country, Singapore took advantage of the liberalisation of foreign investment controls in the Asian region to develop its external economy by investing in various countries in Asia. This "second wing" provided the opportunity for Singapore to benefit from the location-specific resource advantages of neighbouring countries, compensating for its own deficiency of natural resources; this allowed Singapore to remain competitive and to maintain its technological edge over rapidly developing competitors in the region.

Singapore's regionalisation programme involved the establishment of industrial parks in emerging economies in the Asian region which attempted to replicate the business environment found in Singapore (Perry and Yeoh, 2000; Sitathan, 2002). These industrial parks were especially attractive to investors as they were identified with Singapore's positive reputation and strengths in infrastructural development and management. Regionalisation was intended to enable local and Singapore-based multinationals to relocate their resource-dependent operations to overseas industrial parks, while upgrading their domestic operations to higher-end, value-added activities. It was envisioned that these industrial parks would enable companies to benefit from the unique benefits and competencies offered by each location, thus improving their cost-

competitiveness. Simultaneously, Singapore would become a high-value investment hub with strategic links to resource-abundant locations in the region.

International Technology Park Limited

The founding of a Singapore-styled industrial park in India was first proposed by Singapore's Prime Minister Goh Chok Tong and India's Premier, P.V. Narasimha Rao, in 1992. ITPL, located 18km away from Bangalore in India's Silicon Valley, was officially inaugurated in 2000. The partners are a Singapore consortium of companies[2] led by Ascendas International, the Tata Group and the Karnataka state government in a 47-47-6 percent arrangement. ITPL was marketed as an environment that "cuts through the red tape and bottlenecks that are a part of India's infrastructure and operating environment" (The Straits Times, *August 8*, 1999); using the Singapore reputation for transparency and efficiency to differentiate itself from domestic competitors. More distinctively, ITPL guarantees uninterrupted power supply and telecommunication facilities, immediate-occupancy business incubator space, and the formulaic 'one-stop' service. ITPL also houses the Indian Institute of Information Technology, which provides professional and skilled manpower for the Park's tenants. Some data concerning ITPL's operational parameters and current tenant profile is provided, as follows.

TABLE 1: INTERNATIONAL TECHNOLOGY PARK LIMITED OPERATIONAL STATISTICS (AS OF JANUARY 2004)

General Information	
Scale of Development	About 70 acres
Developed Area	1.6 million sq ft
Total Investment Value	SG$280 Million
Confirmed Tenants	106

[2] The Singapore consortium, Information Technology Park Investments Pte Ltd, includes RSP Architects, Planners and Engineers, L&M Properties, Sembawang Industrial, Technology Parks (a Jurong Town Corporation subsidiary) and Parameswara Holdings (the investment arm of the Singapore Indian Chamber of Commerce).

Park Population	12,000

Source: ITPL, Bangalore

TABLE 2: ITPL – TENANT PROFILE:
BY COUNTRY OF ORIGIN

Country	Percent
USA	42
India	36
Europe	16
Asia	6

Source: ITPL, Bangalore

TABLE 3: ITPL – TENANT PROFILE:
BY SECTOR (JANUARY 2003)

Sector	Percent	Sector	Percent
Software Development	49	IC Design	3
BPO/ITES	24	R&D	1
Biotech/Bio-Informatics	3	Educational Institutions	2
Manufacturing	10	Others	8

Source: ITPL, Bangalore

ITPL's first tenants include SAP Labs, First Ring and 24/7; its clients now include Fujitsu, IBM, ING, SAP, Intel and AOL India. There are currently 106 confirmed tenants hiring 12,000 employees. More than half the tenants are multinational companies, and more than 70 percent are in information technology, telecommunications, financial services and research and development; some MNCs have even located their global call centres in ITPL. The park has been operationally profitable and cash-flow positive for the last two years. Construction for the new Inventor building commenced in January, and will bring the total developed area to a total of 2 million square feet. ITPL has also recently, in March 2004, improved its high-tech infrastructure by enabling Wi-Fi (wireless fidelity – Internet connectivity) throughout the park. ITPL is also

engaged in improving its non-technological infrastructure; talks are underway with India's Taj group of hotels to set up a hotel in the park.

Hyderabad Information Technology Engineering Consultancy City (HITEC City)

In the early 1990s, the Andhra Pradesh Government viewed the establishment of a one-stop IT park as a means to attract foreign investment in IT and related sectors; HITEC City – located in Hyderabad City, one of the top three destinations for investment in India – was the eventual result. The 151 acre park offers its occupants a choice of built-up space in 3 different phases: Cyber Towers, Cyber Gateway, and Cyber Pearl (due for completion on 2005). The total available office space in HITEC City is estimated at 5 million sq ft and offers occupants technologically advanced utilities, including point-to-point connectivity and quality power supply.

HITEC has state-of the art infrastructure, communication facilities and amenities. Financial incentives such as waiver of duty charges for companies which wish to relocate to HITEC City are also offered. Furthermore, Hyderabad's top-flight research and training institutes such as Indian Institute of Technology (IIT) are a continual source of top-of-the-line talent. There are future plans for HITEC City to be the nerve centre of 'Cyberabad'- a city envisaged exclusively for knowledge-based enterprises.

These factors have combined to make the park a cynosure for global IT players. International players in the sphere of business such as Microsoft, Thomas Cook, Oracle, GE Capital and HSBC, have shifted operations to HITEC. The 50 operating tenants at HITEC have a total

workforce of 29,000 (Table 2). 50% of the companies are Indian-owned and another 30% are from the USA. 40% of the companies are involved in software development, and research & development. Data on HITEC's operational parameters and tenant profile is as follows.

TABLE 4: HITEC CITY
OPERATIONAL STATISTICS (AS OF DECEMBER 2003)

General Information	
Scale of Development	10 million sq. ft
Developed Area	6 million sq ft
Total Investment Value	US $375 million
Confirmed Tenants	50
Operating Tenants	50
Area Taken Up	6 million sq ft.
Park Population	29,000

Source: L&T INFOCITY LIMITED, Hyderabad

TABLE 5: HITEC CITY – TENANT PROFILE:
BY COUNTRY OF ORIGIN (DECEMBER 2003)

Country	Percent
USA	30
India	50
Europe	12
Others	8

Source: L&T INFOCITY LIMITED, Hyderabad

TABLE 6: HITEC CITY – TENANT PROFILE:
BY SECTOR

Sector	Numbers		Numbers
Software Development	20	Telecommunications	4
BPO/ITES	5	Manufacturing	2
Finance	10	Others	9

Source: L&T INFOCITY LIMITED, Hyderabad

The third phase of HITEC's development, Cyber Pearl, is being by a 50:50 partnership of L&T Infocity Ltd. and Ascendas, which is also a subsidiary of Singapore's Jurong Town

Corporation. On completion, it is projected to provide 500,000 sq ft. of business space. Ascendas is to contribute to the project through its expertise in development and project management, as well as in the operation of the development; L&T is to contribute through its strong customer base and its expertise in architectural and engineering design.

THEORETICAL CONSIDERATIONS

Dunning's Eclectic Paradigm (1970, 1980, 1988, 2001) proffers an analytical framework in which to examine the pattern and extent of activities of firms engaged in value-added activities beyond their national boundaries. It seeks to explain the ability and willingness of firms to serve markets by delving into the reasons behind their choice of exploiting this advantage through foreign production rather than domestic production, exports or portfolio resource flows. The Eclectic Paradigm postulates that foreign investment will only occur if it is advantageous to combine spatially transferable intermediate products produced in the home country, with at least some immobile factor endowments or other intermediate products in another country (Dunning, 1988). Specifically, the configuration of ownership-specific advantages, location-specific advantages, and internalization-incentive advantages (OLI) – the three types of advantages into which Dunning classifies the reasons for the behaviour of firms – determines international production and its nature.

The framework goes on to assert that the import of each advantage in the OLI triumvirate and the relationship between them varies across firms, industries and countries and is context-specific, based on factors including the company's country of origin, and the country it seeks to invest in.

What is common in most firms, however, is the acquisition of the O advantages through exploitation of firm-specific resources, and the simultaneous procurement of I advantages through the diminution of transaction costs. As well, as firms' core competencies become increasingly knowledge-intensive, MNCs will tend to seek locations in which they can best utilize their core competencies; or, by the Eclectic Paradigm, OLI configurations that will work most to their advantage.

More recent literature has widened the ambit of The Eclectic Paradigm to include deliberations on the role of infrastructure in the attraction of new investments; the presence of immobile clusters of complementary value-added activities (Markusen, 1996), and the transactional benefits of spatial proximity (Porter, 1996)

Theories from the perspective of the firm – most notably Porter's value chain analysis (1986, 1994) – have further argued that the production process should be viewed as a value chain, as a firm's fortunes in any given location is dependent on a conglomeration of factors relating to its various activities. As such, they suggest that firms should identify comparative or location-specific advantages unique to individual locations which will serve to complement the advantage they enjoy as a result of being placed higher up in the value chain. It further postulates that, in line with the rapid pace of globalization, location-specific advantages have to be modified to suit the changing circumstances created by integration of rapidly changing global economic activities and the increasing influence of governments and regional authorities over the sphere of business activities in the region. This creates a synergistic advantage by aligning the competitive and comparative advantages of the region in concern. Singapore's ventures into Bangalore and

Hyderabad are motivated primarily by the considerable gains to be reaped from synergizing location-specific advantages and Singapore-style efficiency and management know-how.

ITPL and HITEC both aim to provide prime location-specific advantages for firms conducting activities high up in the value-chain. On the one hand, these IT clusters boast high-quality IT facilities, software specialists from local research centres and training institutes, and networks of IT companies varying in scope and specialization. On the other hand, there is abundant and cheap skilled and unskilled labour. This combination allows for high-value activities to be conducted at low cost. The combination is further enhanced and strengthened by the world-class infrastructure within the parks and strong governmental support. The envisaged product of this combination is industrial parks, distinct amidst the competition, that present themselves as attractive investment enclaves.

EMPIRICAL FINDINGS

Questionnaire surveys

To add empirical rigor to our research, we applied the survey questionnaire developed in Yeoh, et al. (2000) to gauge the differential impact of various push/pull factors on the tenants' decision to locate in the case-study parks. Data was collected on the profile of the respondents, the factors that attracted the respondents to invest in the park, and the constraints on their operations. A total of 80 responses were collected from the case-study IT parks.

Profile of the respondents

There are 47 respondents in the HITEC survey, of which 27 were wholly Indian-owned, 4 were joint-ventures, and 16 were wholly foreign-owned. There were 23 small firms, 17 medium-sized firms, and 7 large firms. Concerning the nature of operations, 23 were involved in software development, 3 in telecommunications, 1 in research and development, 8 in the provision of support services, 10 in the banking sector, and 2 in electronics. And in terms of target markets, 25 firms targeted the domestic market, 18 mainly exported to the USA, while 4 firms catered to other countries.

Of the 33 respondents from ITPL, 4 were wholly Singapore-owned, 6 were joint-ventures, and 23 were wholly foreign-owned. 16 of the respondents were involved in software development, 4 were involved in support services, and 2 in research and development. 15 respondents had a sales turnover of less than US$5 million, while 4 respondents had sales between US$5 million and US$50 million.

Statistical treatment of survey results

Logit analysis was used to compare the location factors influencing the tenants' decision to set up their operations in the case-study parks. The logit model, estimated by maximum likelihood, takes the following form:

$$P_i = \exp(Z_i) / [\, 1 + \exp(Z_i)]$$

where: P_i is the probability of firm being located in the particular park

exp refers to the exponentiation operator, and

Z_i is a linear function of the push/pull factors defined as

$$Z_i = \alpha_0 + \sum_{i=1}^{i=5} \alpha_i F_i$$

where: F_1 = 1 if "Support from local authorities" is selected, 0 otherwise

F_2 = 1 if "Efficient host government institutions" is selected, 0 otherwise

F_3 = 1 if "Competitive labor costs" is selected, 0 otherwise

F_4 = 1 if "Competitive overheads" is selected, 0 otherwise

F_5 = 1 if "Presence of major suppliers" is selected, 0 otherwise

α_0 = constant term

α_i = coefficient of independent (explanatory) variable

Estimated coefficients in the logit model, if statistically significant, would suggest that the firm choosing that particular push/pull factor is more likely to be from HITEC than from ITPL. For example, where HITEC is the dependent variable, if the coefficient of F_1 is *positive* and *significant*, this would suggest that, after taking into account the effects of other push/pull factors, a firm choosing "Support from local authorities" has a higher probability of being a firm located in HITEC than ITPL compared to a firm which did not select this choice as one of their reasons for re-locating, i.e. Support from local authorities is a stronger influence for the HITEC investments than ITPL investments. The results of the statistical test are presented in Table 7, appended to this paper.

A similar logit model was applied to the constraints faced by the parks' tenants:

$$P_i = \exp(Z_i) / [\, 1 + \exp(Z_i)]$$

*w*here: P_i is the probability of firm being located in the particular park

exp refers to the exponentiation operator, and

Z_i is a linear function of the constraints defined as

$$Z_i = \beta_0 + \sum_{i=1}^{i=n} \beta_i C_i$$

where: C_i (1 to n, depending on the type of constraint) = 1 if constraint *i* is selected

, 0 otherwise

β_0 = constant term

β_i = coefficient of independent (explanatory) variable

In this case, estimated coefficients in the logit model, if statistically significant, would suggest that the firm choosing that particular constraint is more likely to be from HITEC than from ITPL. For example, where HITEC is the dependent variable, if the coefficient of C_1 is *positive* and *significant*, this would suggest that, after taking into account the effects of other labor constraints, a firm choosing "shortage of semi-skilled and skilled labour" has a higher probability of being a firm located in HITEC than ITPL compared to a firm which did not select

this choice as one of the constraints they face. The results of the statistical test are presented in Table 8, appended to this paper.

Discussion

Kendall's coefficient of concordance (*w*), at 0.526, suggests that the two parks have distinctively different rankings in respect of their location factors. For example, the tenants located at HITEC City regard efficient host government institutions as the most important factor influencing their decision to invest as seen in the rankings given and also the positive and statistically significant α_2 (=3.814), while it is not the case for ITPL tenants; an interesting result, given that ITPL banked on the efficiency of its Singapore model, and possibly a testament to the degree of commitment to HITEC of Hyderabad's local government. Nonetheless, the tenants at HITEC do share a few similarities to those in ITPL. In both parks, tenants were attracted to establish production there partly due to the support from local authorities and the competitive labour cost present. However, the factor 'support from local authorities' was more likely to be emphasized by the tenants of HITEC, as compared to ITPL tenants, as indicated by the positive and statistically significant α_1 (=1.549); similarly, competitive labour costs, too, seemed to be more important to HITEC tenants, as shown by the positive statistically significant α_3 (=3.677).

Our study, concurrently, touches upon some emerging constraints which have undermined the attractiveness of the case-study parks. These constraints are categorised into three broad groups: labour-related constraints, organization and technology-related constraints, and those relating to the economic 'environment', such as government policies and regulations. As with the location

factors, HITEC tenants appear to encounter a relatively similar 'pattern' of constraints compared to the ITPL scenario as shown by Kendall's *w* (for all constraints) which is estimated at 0.676.

While competitive labour cost is a primary location advantage for HITEC, rising labour costs appear to be diminishing this initial advantage. This constraint was cited by 17 percent of HITEC tenants. This trend may be attributed to the rising standard and cost of living associated with the Park and its surroundings as the Park grows in strength, and the area grows in affluence. Tenants in ITPL also cited this problem as the main labour-related constraint that they faced. Another labour-related problem is a shortage of semi-skilled and skilled labour, as cited by about 17 percent of HITEC tenants. One plausible reason that may explain this is that the park's advantage of attracting professional and highly qualified labour has overshadowed the need for lower-skilled labour.

The 'state-of-the-art' infrastructure of both parks, though reliable and efficient, also proved to be costly, as facilities such as the power plant, waste-treatment system and fully computerised systems are put in place. "High and/or rising overhead costs" was cited by 38.2 percent of HITEC respondents and 48.4 percent of ITPL respondents; further evaluation shows that ITPL tenants are more likely to be concerned by this constraint as shown by the positive and statistically significant β_4 (=-0.975). Kendall's *w,* at 0.658, suggests some similarity in the 'ranking pattern' for organizational and technology-related constraints. In contrast, Kendall's *w*, at 0.000, indicates a high degree of divergence in respect of the "environmental" constraints confronting the survey respondents. True enough – from the ranking, tenants' concerns in this area contrast completely between the two parks. "Competition from similar parks in host

country" was a major constraint faced by HITEC tenants as cited by 72.3 percent of HITEC tenants in contrast with only 0.1 percent of ITPL tenants. A positive and significant β_3 (=3.167) suggests that HITEC tenants are more likely to be more perturbed by this constraint, compared to ITPL tenants.

Case Studies

To lend perspective and some insight to our study, and to delve into the mechanisms of the tenants' decisions from a microscopic viewpoint, we present case studies of three selected firms in ITPL (cases A, B and C), as well as three firms from HITEC (cases D, E and F), with a view to uncovering what influences the tenants to choose one park over the other.

ITPL Case Studies

Case A – Inter-Enterprise Software

Company A is a wholly owned subsidiary of an international software giant that enjoys the position of being the world's largest inter-enterprise software company, and the world's third largest independent software supplier overall. The parent company also employs 28,800 people in over 50 countries.

When Company A was taken over by its parent company in 1998, it moved operations to ITPL. The company chose ITPL over other parks, despite its higher rent, largely due to the following

critical advantages that ITPL provided: uninterrupted power supply, state-of the-art infrastructure, ease and speed of setting up shop, and excellent communication channels.

The company, after four years in the park, has decided to move out. The principal reason given for this is the rapid growth of the firm, from 70 employees to 500 employees today. ITPL is suited for small and medium enterprises and space constraints within it have forced the company to look to other locations. As a fast expanding company, the company no longer views ITPL's costly rent as justifiable. Instead, the company has moved into an expansive new complex, 15 acres in area, where it can enjoy economies of scale. Furthermore, the company views such a shift as an opportunity to establish its own identity, which it had not fully experienced in a multi-tenanted place like ITPL. However, given the park's advantages, the company has not fully pulled out of ITPL, but continues to retain office space in the park's new BTS (Built-To-Suit) facilities.

Case B – Business Process Outsourcing

Company B is a wholly American-owned firm, with its parent company considered a frontrunner in integrating the expanding capabilities of information technology, telecommunications and the internet. The parent company has its headquarters in Virginia, U.S.A. Its services include voice-based services, internet services, back-office functions, and interactive tele-services.

Company B was incorporated in May 1999 as a 100% subsidiary. The company's operations within the park largely focus on business process outsourcing, which include both inbound and

outbound customer care. As is the case for other companies in the same industry, Company B, cites the permanent power supply, 24-hour connectivity and supporting infrastructure as the vital factors that prompted it to situate in the park. The company also employs a sizeable portion of the IT graduates that Bangalore churns out every year.

In addition to the above, the firm perceives ITPL's excellent and professional support services and maintenance programs as a huge advantage that gives it an added edge over its peers that are located elsewhere. These benefits are regarded as the direct result of the Singapore-styled management. However, the company has expressed reservations over the numerous other call centres making their way into ITPL to exploit the same advantages, which invariably leads to other problems such as heightened competition, further sharing of resources and the "the pool of entry level people getting smaller".

Case C – Manufacturing Services

Company C is a wholly Singapore-owned company that specializes in manufacturing machine tools, and is one of the largest machining centres in Asia. The company is based in Japan, but has numerous centres in Singapore, Germany, US, China, Brazil and Mexico.

When ITPL began operations in 1997, Company C was one of the first tenants to move into the park. ITPL was the obvious choice for Company C to set up its office due to the infrastructural facilities and the service quality assurances promised by the 'Singapore Park'. Company C boasts the status of being the first and only manufacturing company located at the park. Taking

office space at the Creator block, manufacturing was limited to demonstrations to customers, and unit assembly, supporting its head office in Singapore.

After five years of operations in the park, Company C vacated its ITPL site in 2002, and moved to its current location, in close proximity to ITPL. The prime reason for Company C's relocation was its need for a cheaper factory space (10 -15 hectares). High ITPL rentals negated the savings that Company C garnered from its choice of setting up in India. ITPL rent is considered extremely high for manufacturing units, and is manageable only for short incumbent periods for larger companies such as Company C, as these companies operate on low margins and require large amounts of space. Hence, when ITPL no longer proved suitable for the fast-growing manufacturing concern, it opted to move out.

HITEC City Case Studies

Case D – Private Bank

Company D is one of the largest banks in India. Company D offers a range of banking products and financial services to both corporate and retail customers in the areas of investment banking, insurance, venture capital, asset management and information technology. Company D was one of the first occupants of the park, starting operations in the park in 1998, with only 5 employees. Today, its facility in the park spreads over 12,000 square feet and employs 50 staff. The office caters to other companies in the park, as well as individuals. The office has managed to secure a

large customer base and has captured a 90% market share in HITEC. However, the office is facing mounting competition from 10 other banks in the vicinity.

Company D chose to set up a branch in HITEC due to the world class reputation and visibility of the park, as well as the reliable service provided by L&T. This decision to set up office in the park has benefited the company well, as it has garnered a large share of the market due to its being the first bank in the park. The market of 29,000 individuals working in the park is a highly lucrative one. However, one constraint that the branch faces is that the location of the park is far from the city centre, making it relatively inaccessible to other people in the community. With rising competition from rival financial institutions, Company D may not be able to maintain a foothold in the park.

Case E – Business Process Outsourcing

Company E is a global healthcare management company, headquartered in Texas. The offshore centre at HITEC was set up as part of business process outsourcing (BPO), functioning as an interface between doctors in the United States and patients worldwide. The centre at HITEC is also involved in developing software that caters to the needs to people in the medical profession. Company E is one of the largest occupants of HITEC, occupying 2 floors at the park and is intending to expand and buy 4 more units when Cyber Pearl of Phase 3 in completed. It currently employs a workforce of 150 and has been enjoying an annual growth of 10%

Company E chose HITEC as it wanted to set up its offshore centre in a facility that provides reliable telecommunications and 24 hour connectivity. The back up generators and fibre optic links at HITEC ensures that employees can work uninterrupted around the clock. In addition, universities such as India Institute of Technology provide the company with a plentiful supply of both medical officers as well as computer engineers. While the company agrees that the rents at HITEC are higher than that of other similar facilities in the city, it feels that the additional costs are justified in order for it to receive hassle-free 1-stop service.

Case F – Publishing

Company F is a subsidiary of a publishing house in the United Kingdom. Operations of Company F spans across print media, web designing, Internet publishing and conference organisation. Company F began operations at HITEC in August 2003, with 50 employees.

HITEC was chosen because of its location in Asia, which would enable Company F to begin its planned expansion into the Asia Pacific market. In addition, HITEC is situated in India, allowing the company to enjoy and take advantage of low costs, an educated workforce as well as a massive domestic market. HITEC was chosen over other parks because of its reliable infrastructure, with guaranteed maintenance and support services. Every facility required by Company F was fully provided for and the company could move into the facility immediately and commence operations. Legal hassles were taken care of by the Software Technology Parks of India (STPI), which allows the company to focus its attention on its operations. However, the director did express some dissatisfaction with the lackadaisical attitude of people from

Hyderabad. While they are educated, they, in Company F's opinion, lack enthusiasm, which is felt to be an essential ingredient for innovation.

DISCUSSION

Singapore typically markets its industrial parks on the basis of its infrastructure development expertise, supplemented by the location-specific advantages of the host country. India's liberalization policy has allowed multi-nationals to shift operations to India to take full advantage of these comparative advantages. Companies like Company B, who operate call centres using a large number of Indian graduates, cited the availability of cheap and plenteous labour available in India as providing them with an edge over call centres in other regions. India's policy also provides immense opportunities to such MNCs who are looking to enter the growing and untapped Indian market. Company F chose to locate in India because of the low costs, competitively affordable workforce and large domestic market; this company is representative of the fact that resource-seeking and market-seeking motives act as primary drivers behind the decisions of such MNCs to begin operations in India. However, the location-specific advantages found in India such as competitive labour costs, access to a large domestic market and a skilled, educated workforce are enjoyed by both ITPL and HITEC City.

Both parks also share some similarities in their pull factors. ITPL is often regarded as having "pioneered the concept of an integrated work, live and play business-lifestyle environment," and "set the benchmark for a new generation of tech parks in India." (The Business Times, 14 Jan 2004) Tech parks such as HITEC City have since followed this holistic approach to constructing

their development. Both parks are thus able to boast such innovations as one-stop service. The standards set by ITPL in the area of infrastructure have also been met by HITEC; almost all of the case study companies cited that their choice to locate operations in both parks was greatly influenced by the parks' infrastructural superiority, including advantages such as uninterrupted power supply, state of the art infrastructure and 24-hour connectivity. Both parks also offer an ample supply of educated graduates, due to the proximity of the International Institute of Information Technology and the Indian Institute of Information Technology, Bangalore to HITEC and ITPL respectively, which served to attract tenants such as Companies B and E.

The distinguishing selling point that ITPL possesses, however, is Singapore's political commitment to the park, as demonstrated by the many bilateral agreements between Singapore's GLCs and India, politically linked business conglomerates, and the host of investment incentives to attract transnational corporations to these 'privileged' enclaves. This strategy has worked, as the impetus for firms to settle in ITPL has been exceptional infrastructural facilities and the efficient Singapore-styled management, both associated to Singapore's affiliation to the park, as cited by Companies B and C. Singapore's presence in the park differentiates ITPL from its competitors as the city-state is renowned for its management skills, disciplined efficiency and corruption-free administration. A distinct premium is placed on ITPL's connection to Singapore, because of the Republic's positive reputation; so much so that there almost seems to be a certain prestige in being located in the "Singapore Park[3]". Most ITPL case companies mentioned common pull factors, namely, ease and speed of setting up shop, excellent communication channels, exceptional support and maintenance services and quality assurance promised by the

[3] This was a constant refrain throughout our on-site interviews in ITPL in December 2002.

"Singapore Park" as important factors that made them choose ITPL. These advantages are provided by way of the cooperation and agreements between the Singaporean and Indian governments.

Compared to the pull factors cited by ITPL companies, those raised by the HITEC case companies were more varied. For Company D and F, the visibility of the park and its guaranteed maintenance and support services were key reasons for their decision to locate in the park. Dealing with legal hassles is facilitated for HITEC tenants by the Software Technology Parks of India and is a pull factor cited by company F. It is interesting to note, however, that the Singapore connection enjoyed by ITPL seems to guarantee, in ITPL tenants' minds, much the same thing – guaranteed maintenance and support services, and support from local administration. Taking into account the empirical findings, it would seem that what tenants in the two parks look for is generally not very different at all; and that the Singapore connection would seem to encapsulate many of the same advantages HITEC is seen to offer.

The 'state-of-the-art' infrastructure of both parks, though reliable and efficient, has proved to be costly, as new facilities such as the power plant, waste-treatment and fully computerised systems are put in place. High overhead costs were cited by case study companies A and C in ITPL and company E in HITEC. Both parks charge higher rent than other parks in the vicinity with similar facilities. Heightened competition was also a shared constraint for both parks. This points to the need for changes – perhaps streamlining of processes, or introducing additional incentives – to be implemented in the future, in order for both parks to continue to draw tenants with their superior infrastructure, while keeping costs competitive.

Tenants have found ITPL unsuitable to the needs of their companies as their scope of operations expands, as seen through companies A and C. The park has been observed to suit the needs of small and medium enterprises (SME) better than it does the needs of larger firms. However, as ITPL was established in order to allow for the outsourcing of pieces of multi-national firms' operations, this would seem to be in line with the objective of the park. It is worth noting that company A retains an office in ITPL, and company C remains in close proximity to it. However, changes may yet be necessary to allow ITPL to retain larger tenants.

HITEC may not be advantageous for service-providing companies hoping to cater to the tenants in the park. For example, company D in HITEC cited the distance of the park from the city centre as a constraint. This prevents tenants from gaining access to potential customers in the city. This coupled with rising competition in the park may prove to be disadvantageous for both tenants and HITEC, especially for the tenants providing financial services within the park.

To a large extent, the parks have succeeded in providing the crucial links within the value-added chain that give its client firms a competitive advantage. Our study hints at certain emerging constraints which are related to India's ability to sustain its location-related advantages. Inevitably, the advantages of low labour and overhead costs will erode over time. Thus, both parks need to find other incentives and draw points to retain their attractiveness.

CONCLUSION

Location-specific advantages and the Singaporean influence and affiliation have contributed to enhancing the attractiveness of ITPL. However, as mentioned in the above section, these advantages do come with numerous other limitations, such as high/rising costs and competition from similar parks in the host country; limitations faced by competitors as well, but to a perhaps larger degree by ITPL than by most competitors.

Much of ITPL's success can be attributed to its reputation for "Singapore-styled design and management". In a country where corporate image is of immense importance, the Singapore presence contributes tremendously to the reputation of the park and, by extension, its tenants. In fact, ITPL is being used by many tenants to establish their brand-image. ITPL also has the advantage of being the pioneer in the concept of building the park to incorporate work, lifestyle and play. As a park that set a precedent that others now emulate, ITPL has the distinction of revolutionising the India industrial park market, further enhancing its reputation.

It has served Singapore well to extend its external wing into India, with India being one of the biggest beneficiaries of the global shift of high-wage professional jobs to low cost countries (Straits Times, August 2003). The supply of qualified, English speaking professionals at lower cost has given the country an edge in wooing foreign companies. The global economy today is increasingly dependent on low-cost labour, which is capitalised on by MNCs. In fact, the Singapore government has consistently shown that it recognises that India's low-cost competitiveness offers much opportunity. However, India must continue to take steps to ensure that its location-specific advantages are not eroded by its own rising affluence, or at least that the process of erosion is slowed to enable the country to find other comparative advantages. It is

worth noting that many of these same advantages and constraints were once faced by Singapore itself; India, however, is very different from Singapore, and it remains to be seen how far the Singapore experience will translate into the further development of ITPL.

Seeing how the positive reputation that Singapore enjoys has given a considerable boost to the city-state's industrial park, it is wise then that Singapore has announced that it will have a stake in the third and final phase of HITEC City, Cyber Pearl. This diversification of investments into different parks will enable Singapore to withstand the increasing competition facing ITPL; HITEC will also be banking on the Singapore reputation to boost its own image and reinforce its own comparative advantages, already similar in many ways to what the Singapore connection is viewed as providing. Numerous other parks in the same vicinity, such as Software Tech Park and Vanenburg, have entered the market and are heightening the competition for foreign investments. However, the Singaporean connection, it seems, has proven to be an important marketing edge over other parks; this affiliation, we believe, will continue to enable ITPL and now HITEC to hold their own in the competition for tenants.

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Table 7: Factors Influencing the Respondents' Decisions to Invest in HITEC City and ITPL

Variables	Popular Ranking				Maximum Likelihood Estimates- Binary Logit $^{\psi, \phi}$	
	HITEC		ITPL			
	Frequency	Rank	Frequency	Rank	α_i	p-value
Support from local authorities	37	2	7	1	1.549	0.070 ***
Efficient host government institutions	39	1	1	4	3.814	0.000 *
Competitive labor costs	13	3	5	2	3.677	0.057 ***
Competitive overheads	3	4	1	4	-1.557	0.402
Presence of major suppliers	1	5	2	3	2.408	0.138
Constant (α_0)					-2.408	0.003 *

Source: Questionnaire surveys.

Kendall's $w = 0.526$

Note: $^{\psi}$ Estimated values were taken from "forced entry" regression.
$^{\phi}$ p-values are for 2-tailed tests.
* Significant at 1% level
** Significant at 5% level
*** Significant at 10% level

Table 8: Constraints on the Respondents' Operations in HITEC City and ITPL

Variables	Popular Ranking				Maximum Likelihood Estimates – Binary Logit $^{\psi, \phi}$	
	HITEC		ITPL			
	Frequency	Rank	Frequency	Rank	α_i	p-value
Labor-related constraints						
Shortage of semi-skilled and skilled labor	8	2 (5)	3	4 (7)	0.001	0.999
Shortage of professionals and managers	6	5 (9)	4	3 (5)	-0.448	0.542
Rising labor costs	8	2 (5)	7	1 (3)	-0.733	0.287
Industrial relations problems	8	2 (5)	3	4 (7)	-0.141	0.861
Others	9	1 (4)	7	1 (3)	-0.681	0.331
Constant (α_0)					1.166	0.017**
Organizational and technology-related constraints						
Difficulty in obtaining capital equipment	3	4 (12)	3	2 (7)	-0.734	0.409
Difficulty in introducing new technology and techniques	5	3 (11)	3	2 (7)	-0.436	0.597
Lack of good supporting services	15	2 (3)	2	4 (12)	0.463	0.502
High and/or rising overhead costs	18	1 (2)	16	1 (1)	-0.975	0.084***
Constant (β_0)					1.142	0.024**
'Environmental' constraints						
Impact of host government regulations	6	3 (9)	8	1 (2)	0.156	0.837
Competition from overseas competitors	7	2 (8)	4	2 (5)	0.993	0.217
Competition from similar parks in host country	34	1 (1)	3	3 (7)	3.167	0.000*
Constant (β_0)					-0.777	0.163

Source: Questionnaire surveys.
Kendall's *w* for:

1. Labor constraints = 0.676
2. Organizational and technological constraints = 0.658
3. Environmental constraints = 0.000

All constraints = 0.519

Note: $^{\psi}$ Estimated values were taken from "forced entry" regression
$^{\phi}$ p-values are for 2-tailed tests.
* Significant at 1% level
** Significant at 5% level
*** Significant at 10% level